UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,615	12/18/2000	Sheldon Schultz	2003-0001.20	1773

22918 7590 02/23/2007

PERKINS COIE LLP
P.O. BOX 2168
MENLO PARK, CA 94026

EXAMINER	
LAM, ANN Y	
ART UNIT	**PAPER NUMBER**
1641	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/740,615	SCHULTZ ET AL.	
	Examiner	Art Unit	
	Ann Y. Lam	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-26,28 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-26,28 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicants' appeal brief filed November 13, 2006 is acknowledged. Upon further consideration, prosecution is hereby re-opened.

Information Disclosure Statement

The information disclosure statement filed July 29, 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein (regarding the non-patent literature publication) has not been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(e) the invention was described in (1) an application for
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19, 22-26 and 28-29 are rejected under 35 U.S.C. 102(e) as being anticipated by King et al., 5,633,724.

The King et al. reference discloses an apparatus comprising:

an optical light source (see column 14, line 20) for illuminating a field having a plurality of plasmon resonant entities (PREs),

an optical detector (i.e., CCD, col. 6, lines 13-15) for detecting a spectral emission characteristics of individual PREs and other light scattering entities in the field, where said optical light source and detector are designed to allow detecting the spectral emission characteristics of PREs and other light scattering entities in the field at each of a plurality of different spectral wavelengths (col. 4, line 62 – col. 5, line 3, discloses that analytes are labeled with molecular tags, and that different pixels in a pixel array of target substances having different chemicals suitable for binding to different target analytes; and col. 5, lines 29-34, discloses that the light beam is provided with the correct frequency, temporal, and intensity properties to result in the maximum optical signal from the molecular tags, and in such a way that the evanescent field excites one, some or all of the pixels of the array; and col. 6, lines 3-14, gives an example wherein all the pixels in the array are simultaneously excited by an evanescent field and detected by a CCD array),

an image processor (122, see column 5, lines 58-59) operatively connected to the detector for constructing a computer image of the positions and values of the

spectral emission characteristic of individual PREs and other light-scattering entities in the field at each of said plurality of spectral wavelengths (see col. 4, lines 52-55, disclosing that the optical signal is detected and the resulting pattern of light and dark pixels may be analyzed by a device, a computer, appropriate for analyzing such patterns; and see col. 5, lines 57-60, disclosing that the computer is connected to the detection system for electronically collecting and analyzing the data generated by the detection system; and see col. 6, lines 4-14, disclosing that a light beam is provided so that all the pixels in the array are simultaneously excited by an evanescent field, and an imaging system collects and images the optical signal through an optical filter and onto a two-dimensional array detector such as a CCD; and see col. 7, lines 3-5, disclosing that the array is illuminated and the resulting light and dark fluorescence pattern is detected; and col. 7, lines 17-27, disclosing that the intensity of the fluorescence is also detected)

discriminator means (i.e., computer 122; it is noted that this claimed element invokes 112, sixth paragraph) for discriminating PRE's with a selected spectral signature from other light-scattering entities in the computer image, based on a comparison of a selected spectral characteristic of PREs and other light-scattering entities in the field determined over said different spectral wavelengths (see col. 4, lines 52-55, disclosing that the optical signal is detected and the resulting pattern of light and dark pixels may be analyzed by a device, a computer, appropriate for analyzing such patterns; and col. 4, line 66 – col. 5, line 4, disclosing that different pixels have different chemicals suitable for binding to different target analytes and by detecting which of the

pixels are excited, the presence of a target substance can be determined; and col. 5, lines 57-60, disclosing that the computer is connected to the detection system for electronically collecting and analyzing the data generated by the detection system; and col. 6, lines 42-54, disclosing that fluorescence is only one of a class of optical probe techniques that rely on light intensity and changes or conversions in the light frequency and the like that can be used in the invention and that other examples are Raman scattering or surface-enhanced Raman scattering, and other non-linear optical techniques; and col. 7, lines 1-8, disclosing that the array is illuminated and the resulting light and dark fluorescence pattern is detected and together with knowledge of the receptors yield the desired information about the chemical composition of the sample), (that is, the computer is disclosed as being used to analyze the pattern of light and dark pixels, and the analysis described includes determining the presence of a target substance based detecting which of the pixels are excited; the determination of fluorescence versus non-fluorescence at the different pixels is the comparison of spectral characteristics of PREs and other light-scattering entities, and it is determined over different spectral wavelengths since it is disclosed in col. 4, line 62 – col. 5, line 3, that analytes are labeled with molecular tags, and that different pixels in a pixel array of target substances having different chemicals suitable for binding to different target analytes; and in col. 5, lines 29-34, that the light beam is provided in such a way that the evanescent field excites one, some or all of the pixels of the array; and col. 6, lines 3-14, gives an example wherein all the pixels in the array are simultaneously excited by an evanescent field and detected by a CCD array),

(Applicants' specification on page 22, lines 28-31 disclose that the discriminator could classify light-scattering entities in the field in a number of ways including distinguishing PREs from non-PRE light scattering entities. Thus, according to Applicants' specification, distinguishing PREs from non-PRE light scattering entities is a comparison of spectral characteristics of PREs and other light-scattering entitites. King et al. disclose distinguishing PRE's, i.e., those that fluoresce from other light-scattering entities, i.e., molecules at pixels in which there is no fluorescence (col. 5, lines 1-4); moreover, the detection of different molecules in different pixels (col. 4, line 67) by simultaneously exciting the pixels (see col. 5, lines 32-34) using a power source with different wavelengths (see col. 12, lines 1-2) is a comparison, i.e., distinguishing molecules that fluoresce from those that do not, at different wavelengths)

and output means for displaying information about the field based on the information about the selected PREs (see column 13, lines 62-65, disclosing that the fluorescence detector is connected to a processor which converts the signals from the detector to a form suitable for transmission to another system and/or for display on a conventional display device), (it is noted that this limitation invokes 112, sixth paragraph).

As to claim 21, the light source includes means for illuminating at a plurality of different wavelengths (see column 12, line 2), (this limitation invokes the 112, sixth paragraph.)

As to claim 22, the detector is a two-dimensional photodetector array (208a, see column 6, line 8-9) capable of detecting a spectral emission characteristic simultaneously from a plurality of illuminated PREs.

As to claim 23, the detector includes means (CCD) for spectrally separating light emitted from the PREs into said plurality of different spectral wavelengths (this limitation invokes the 112, sixth paragraph), (see col. 4, line 62 – col. 5, line 3, discloses that analytes are labeled with molecular tags, and that different pixels in a pixel array of target substances having different chemicals suitable for binding to different target analytes; and col. 5, lines 29-34, discloses that the light beam is provided with the correct frequency, temporal, and intensity properties to result in the maximum optical signal from the molecular tags, and in such a way that the evanescent field excites one, some or all of the pixels of the array; and col. 6, lines 3-14, gives an example wherein all the pixels in the array are simultaneously excited by an evanescent field and detected by a CCD array), (i.e., the CCD can separate light emitted from the different substances), and said image processor operates to form a computer image of the positions and values of the emission spectral characteristic of individual PREs and other light-scattering entities (column 13, lines 62-65, disclosing that the fluorescence detector is connected to a processor which converts the signals from the detector to a form suitable for transmission to another system and/or for display on a conventional display device).

As to claim 24, the optical detector includes a two-dimensional array of optical fibers (450, see column 14, lines 20-25) whose output is aligned so as to constitute a

line source that is sent into a grating or prism (104, see column 5, line 6), and a two-dimensional detector array (208a, see column 6, line 8-9).

As to claim 25, there is a means for moving the target in an x-y plane (this limitation invokes 112, sixth paragraph), (see column 10, line 6-10.) (The specification gives an example of moving a microscope slide, but does not give further details. Thus, the substrate surface on which test samples are placed and which may be removable, is considered to be a means for moving the target in an x-y plane.)

As to claim 26, the image processor operates to construct an image of PRE positions (see column 4, lines 52-55 and column 5, lines 53-60, and column 6, lines 13-15, and col. 13, lines 61-65) and peak intensity (see column 7, lines 17-27, and col. 13, lines 56-61.)

As to claim 27, the image processor operates to construct an image of PRE positions (see column 4, lines 52-55 and column 5, lines 53-60, and column 6, lines 13-15 and col. 13, lines 61-65) and fluorescence emission spectrum or Raman spectrum (see column 6, lines 42-50.)

As to claim 28, the discriminator means includes means for discriminating PREs based on detected values of peak intensity (see column 4, line 66 – column 5, line 4, and column 6, line 62 – column 7, line 27; and col. 13, lines 61-65.)

As to claim 29, the discriminating means discriminates for a selected type of PRE, or those PREs which are interacting with one another and those which are not (see column 4, lines 36-42, disclosing that evanescent excitation is utilized to generate an optical signal that indicates the presence or absence of binding between ligands and

receptors on pixels on the array and that the binding pattern produced allows information to be determined about the presence of the ligand; and see column 4, line 66 – column 5, line 4, and lines 57-60, disclosing that the computer collects and analyze the data generated by the detection system; and column 4, line 67- col. 4, disclosing that different pixels have different chemicals; and column 6, line 62 – column 7, line 8, disclosing that certain pixels will have fluorophores bound and others not and that the fluorescence pattern is detected.) The detection of fluorophores is the discrimination of that molecule from others, i.e., those that did not fluoresce, as well as the discrimination of ligands that bind to receptors (col. 4, lines 36-42.) Applicants' specification on page 22, lines 28-31) disclose that the discriminator could classify light-scattering entities in the field in a number of ways including distinguishing PREs from non-PRE light scattering entitites.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over King et al., 5,633,724, in view of Shafer et al., 5,717,518.

King et al. disclose the invention substantially as claimed (see above), except for the light source including a bright field/dark field lens. King et al. teach that the light source may include known optical components, e.g., lens (col. 9, lines 30-32 and col. 15, line 5), but King et al. do not specifically teach bright field/dark field lens.

However, Shafer et al. teach that UV objective lens that is useful in bright field, dark field and fluorescence techniques, among others, and that some or all of these techniques can be used simultaneously or in sequence within the same objective lens (col. 10, line 64 – col. 11, line 6.) The object lens is disclosed as providing the advantage of a large field size which allows for high speed inspection of a wafer surface (col. 9, lines 28-34) and the advantage of multi-wavelength capability in contrast to prior UV objectives which have relatively narrow band designs (col. 9, lines 41-45). The object lens can be used with CCDs, and can be used in the analysis of fluorescence to determine compositions of materials (col. 10, lines 25-36.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the UV lens disclosed by Shafer et al. as the lens generally disclosed by King et al., because Shafer et al. teach that the disclosed lens provides advantages such as providing a large field size which allows for high speed inspection of a wafer surface and the advantage of multi-wavelength capability in contrast to prior UV objectives which have relatively narrow band designs. Moreover, the skilled artisan would have reasonable expectation of success in utilizing the lens disclosed by Shafer et al. in the King et al. device because Shafer et al. teach that the lens can be used with CCD detectors (such

as the CCD detector in the King et al. system) and can be used to analyze fluorescence (such as the fluorescence analysis in the King et al. invention.)

Response to Arguments

Applicants' arguments in the appeal brief filed November 13, 2006 have been fully considered and are persuasive in part and not persuasive in part.

Applicants argue on page 5 that the video camera cited by Examiner in the previous Office is not a discriminator means and, on page 6, that the CCD array in the King et al. reference does not perform the recited functions of the claimed discriminator means as a CCD array simply converts photon events to electrical signals that can be displayed or further processed. Applicants also state on pages 7-8 that while the King et al. reference discloses a computer that analyzes optical signals, there is no disclosure of what optical signal is analyzed other than the fact that the optical signal consists of light and dark pixels, nor what analysis is carried out on the signal. Applicants also state on page 9 that any optical device that any optical device can be operated at different excitation or detection frequencies, for purposes of detecting different reporter molecules, but that this shows that King et al. disclose a discriminator means is entirely misplaced, since the ability to discriminate different population of fluorescent reporters in King et al. is based entirely on human activity, by selecting different excitation or detection wavelengths, and by viewing displays taken at different excitation or detection wavelengths.

Examiner hereby withdraws the previous grounds for rejection which had pointed to the video camera as the discriminator means. The new grounds for rejection relies on the disclosure of the computer as the discriminator means. King et al. disclose that the computer is used for analyzing patterns of light and dark pixels (see col. 4, lines 52-55, and col. 5, lines 57-60). Moreover, column 7, lines 1-8, discloses that the array is illuminated and the resulting light and dark fluorescence pattern is detected and together with knowledge of the receptors yield the desired information about the chemical composition of the sample. Thus, the analysis relates to determining the chemical compositions of the sample from the fluorescence pattern, and a computer is disclosed as being used for analyzing patterns of light and dark pixels, and nowhere is it disclosed that this analysis is performed by human activity. The only analysis disclosed is that performed by a computer.

Applicants also argue that nowhere in the King et al. reference is it disclosed that any structure functions to compare a selected spectral characteristic of PREs and other light-scattering entities in the field determined over different wavelengths; and use of such comparison to discriminate PREs with a selected spectral signature from other light scattering entities.

However, Applicants' specification on page 22, lines 28-31 disclose that the discriminator could classify light-scattering entities in the field in a number of ways including distinguishing PREs from non-PRE light scattering entities. Thus, according to Applicants' specification, distinguishing PREs from non-PRE light scattering entities is a comparison of spectral characteristics of PREs and other light-scattering entitites. King

et al. disclose distinguishing PRE's (those that fluoresce) from other light-scattering entities (i.e., molecules at pixels in which there is no fluorescence) (see col. 5, lines 1-4). Moreover, the detection of different molecules in different pixels (col. 4, line 67) by simultaneously exciting the pixels (col. 5, lines 32-34) using a power source with different wavelengths (col. 12, lines 1-2) is a comparison (i.e., distinguishing molecules that fluoresce from those that do not) at different wavelengths.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann Y. Lam whose telephone number is 571-272-0822. The examiner can normally be reached on Mon.-Fri. 10-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

2/19/07

ANN YEN LAM
PATENT EXAMINER